

WHAT IS CLAIMED IS:

1. A vehicle body structure comprising:

a vehicle body including a vertically extending door mounting pillar with a vehicle interior facing side and a vehicle exterior facing side, the door mounting pillar having an inner side wall disposed on the vehicle interior facing side, an outer side wall disposed on the vehicle exterior facing side, a pair of connecting end walls extending between the inner and outer side walls to define a hollow interior space, and an exterior wall portion disposed adjacent one of the connecting end walls in an area outside of the hollow interior space;

a door swingably mounted to the door mounting pillar of the vehicle body to move between a closed position and an open position; and

a door hinge assembly mounted between the door mounting pillar and the door to swingably mount the door to the door mounting pillar for movement between the closed position and the open position, the door hinge assembly being fastened at interior fastening points on the inner side wall of the door mounting pillar and at exterior fastening points on the exterior wall portion of the door mounting pillar.

2. The vehicle body structure according to claim 1, wherein

the door hinge assembly includes a double pivot pin arrangement having a first vertical pivot axis arranged to pivot the door from the closed position to a first open position as the door pivots about the first vertical pivot axis, and a second vertical pivot axis arranged to pivot the door from the first open position to a second open position as the door pivots about the second vertical pivot axis.

3. The vehicle body structure according to claim 2, wherein

the first vertical pivot axis is arranged such that the door pivots about 90 degrees from the closed position to the first open position as the door pivots about the first vertical pivot axis, and the second vertical pivot axis is arranged such that the door pivots about 170 degrees from the first open position to the second open position.

4. The vehicle body structure according to claim 1, wherein
the door hinge assembly includes a pillar mounting member mounted to the door
mounting pillar, a door mounting member mounted to the door, and a connecting member
pivotally mounted at a first end to the pillar mounting member and a second end pivotally
5 mounted to the door mounting member such that the connecting member moves between a
retracted position and an extended position, a majority of the connecting member being
disposed within the hollow interior space of the door mounting pillar when in the retracted
position and a majority of the connecting member being disposed outside of the hollow
interior space of the door mounting pillar when in the extended position.

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5. The vehicle body structure according to claim 1, wherein
the door hinge assembly includes a plurality of fasteners coupling the door hinge
assembly to the door mounting pillar at the interior and exterior fastening points, the
fasteners having longitudinal fastening axes that extend in a substantially orthogonal
15 direction to the vehicle interior and exterior facing sides of the door mounting pillar.

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6. The vehicle body structure according to claim 1, wherein
the door mounting pillar further includes a contoured pocket located on the inner
side wall, the contoured pocket being recessed inwardly from the interior fastening points
20 towards an interior area of the vehicle body to receive a swinging portion of the door
hinge assembly when the door is in the closed position.

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7. The vehicle body structure according to claim 6, wherein
the contoured pocket is a cup shaped reinforcement member having at least parts
25 overlying the interior and exterior fastening points.

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8. The vehicle body structure according to claim 1, wherein
the door hinge assembly includes an upper hinge, a lower hinge, and a torsion bar
extending substantially vertically between the upper and lower hinges.

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9. The vehicle body structure according to claim 8, wherein
the door hinge assembly further includes a plurality of fasteners coupling the upper
and lower hinges to the door mounting pillar at the interior and exterior fastening points,
the fasteners having longitudinal fastening axes that extend in a substantially orthogonal
5 direction to the vehicle interior and exterior facing sides of the door mounting pillar, and
the torsion bar being located between the longitudinal fastening axes of the fasteners
disposed at the interior fastening points and the longitudinal fastening axes of the fasteners
disposed at the exterior fastening points as viewed along the direction of the longitudinal
fastening axes when the door is in the open and closed positions.

10. The vehicle body structure according to claim 8, wherein
the upper and lower hinges are arranged and configured to form a double pivot pin
arrangement having a first vertical pivot axis arranged to pivot the door from the closed
position to a first open position as the door pivots about the first vertical pivot axis, and a
15 second vertical pivot axis arranged to pivot the door from the first open position to a
second open position as the door pivots about the second vertical pivot axis.

11. The vehicle body structure according to claim 10, wherein
the first vertical pivot axis is arranged such that the door pivots about 90 degrees
20 from the closed position to the first open position as the door pivots about the first vertical
pivot axis, and the second vertical pivot axis is arranged such that the door pivots about
170 degrees from the first open position to the second open position.

12. The vehicle body structure according to claim 9, wherein
25 the door mounting pillar further includes upper and lower contoured pockets
located on the inner side wall, the upper and lower contoured pockets being recessed
inwardly from the interior fastening points towards an interior area of the vehicle body to
receive upper and lower swinging portions of the upper and lower hinges, respectively,
when the door is in the closed position.

13. The vehicle body structure according to claim 12, wherein the upper and lower contoured pockets are cup shaped reinforcement members having at least parts overlying the interior and exterior fastening points.

5 14. The vehicle body structure according to claim 8, further comprising an electrical device mounted in the door; and a wiring harness extending between the electrical device mounted in the door and the door mounting pillar with an intermediate portion of the wiring harness coupled to the torsion bar.

10 15. The vehicle body structure according to claim 14, wherein the wiring harness is coupled to the torsion bar by a coupling member that is configured and arranged such that the wiring harness moves relative to the coupling member when the door is moved between the closed and open positions.

15 16. The vehicle body structure according to claim 15, wherein the coupling member is coupled to the torsion bar so as to be constrained from substantial vertical movement along the torsion bar.

20 17. The vehicle body structure according to claim 1, wherein the door hinge assembly includes an upper hinge having an upper pillar mounting member mounted to the door mounting pillar, an upper door mounting member mounted to the door, and an upper goose-neck connecting member pivotally mounted at a first end to the upper pillar mounting member for pivoting about a first vertical pivot axis and a second end pivotally mounted to the upper door mounting member for pivoting about a second vertical pivot axis, and

25 a lower hinge having a lower pillar mounting member mounted to the door mounting pillar, a lower door mounting member mounted to the door, and a lower goose-neck connecting member pivotally mounted at a first end to the lower pillar mounting member for pivoting about the first vertical pivot axis

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and a second end pivotally mounted to the lower door mounting member for pivoting about the second vertical pivot axis, and
a torsion bar extending substantially vertically between the upper and lower
goose-neck connecting members.

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18. The vehicle body structure according to claim 17, wherein
the upper and lower pillar mounting members are fastened to the door mounting
pillar at first and second fastening points with the first fastening points being disposed
rearwardly of the torsion bar and the second fastening points are disposed forwardly of the
torsion bar at least when the door is in the closed and open positions.

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19. The vehicle body structure according to claim 17, wherein
the first vertical pivot axis is arranged such that the door pivots about 90 degrees
from the closed position to a first open position as the door pivots about the first vertical
pivot axis, and the second vertical pivot axis is arranged such that the door pivots about
170 degrees from the first open position to a second open position.

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20. The vehicle body structure according to claim 17, wherein
the upper and lower goose-neck connecting members are configured and arranged
to move between a retracted position and an extended position, a majority of the upper and
lower goose-neck connecting members being disposed within the hollow interior space of
the door mounting pillar when in the retracted position and a majority of the upper and
lower goose-neck connecting members being disposed outside of the hollow interior space
of the door mounting pillar when in the extended position.

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21. The vehicle body structure according to claim 17, wherein
the door hinge assembly includes a plurality of fasteners coupling the door hinge
assembly to the door mounting pillar at the interior and exterior fastening points, the
fasteners having longitudinal fastening axes that extend in a substantially orthogonal
direction to the vehicle interior and exterior facing sides of the door mounting pillar.

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22. The vehicle body structure according to claim 21, wherein
the door mounting pillar further includes upper and lower contoured pockets
located on the inner side wall, the upper and lower contoured pockets being recessed
inwardly from the interior fastening points towards an interior area of the vehicle body to
5 receive the upper and lower goose-neck connecting members, respectively, when the door
is in the closed position.

23. The vehicle body structure according to claim 22, wherein
the upper and lower contoured pockets are cup shaped reinforcement members
10 having at least parts overlying the interior and exterior fastening points.

24. A method of attaching a door hinge assembly between a door and a door
mounting pillar of a vehicle body comprising:
attaching a first part of the door hinge assembly to the door; and
15 attaching a second part of the door hinge assembly to the door mounting pillar at
interior fastening points located within a hollow interior space of the door mounting pillar
and at exterior fastening points located on an exterior wall portion of the door mounting
pillar.

20 25. The method according to claim 24, wherein
the attaching of the second part of the door hinge assembly is performed by
installing
a plurality of interior fasteners from an interior-to-exterior direction of
the vehicle body to secure an interior portion of the second part of
25 the door hinge assembly within the hollow interior space of the
door mounting pillar, and
a plurality of exterior fasteners from an exterior-to-interior direction of
the vehicle body to secure an exterior portion of the second part of
the door hinge assembly to the exterior wall portion of the door
30 mounting pillar.

26. The method according to claim 25, wherein

the installing of the interior and exterior fasteners includes

positioning the interior fasteners relative to the door hinge assembly

such that longitudinal fastening axes of the interior fasteners are

disposed on a first side of a vertical torsion bar that connects

upper and lower hinges of the door hinge assembly together when

the door is in open and closed positions, and

positioning the exterior fasteners relative to the door hinge assembly

such that longitudinal fastening axes of the exterior fasteners are

disposed on a second side of the vertical torsion bar when the

door is in the open and closed positions in which the second side

is opposite to the first side with respect to a vertical plane passing

through the vertical torsion bar.

27. The method according to claim 26, further comprising

attaching a wiring harness extending between an electrical device mounted in the

door and the door mounting pillar to the vertical torsion bar.

28. The method according to claim 24, further comprising

configuring the door hinge assembly to include a pillar mounting member mounted

to the door mounting pillar, a door mounting member mounted to the door, and a

connecting member pivotally mounted at a first end to the pillar mounting member and a

second end pivotally mounted to the door mounting member such that the connecting

member moves between a retracted position and an extended position, a majority of the

connecting member being disposed within the hollow interior space of the door mounting

pillar when in the retracted position and a majority of the connecting member being

disposed outside of the hollow interior space of the door mounting pillar when in the

extended position.

29. The method according to claim 24, further comprising configuring the door hinge assembly to include

an upper hinge having an upper pillar mounting member mounted to the door mounting pillar, an upper door mounting member mounted to the door, and an upper goose-neck connecting member pivotally mounted at a first end to the upper pillar mounting member and a second end pivotally mounted to the upper door mounting member,

a lower hinge having a lower pillar mounting member mounted to the door mounting pillar, a lower door mounting member mounted to the door, and a lower goose-neck connecting member pivotally mounted at a first end to the lower pillar mounting member and a second end pivotally mounted to the lower door mounting member, and

a torsion bar extending substantially vertically between the upper and lower goose-neck connecting members.

30. The method according to claim 29, wherein

the attaching of the second part of the door hinge assembly is performed by installing and positioning

interior fasteners relative to the door hinge assembly such that

longitudinal fastening axes of the interior fasteners are disposed on a first side of the vertical torsion bar when the door is in open and closed positions, and

exterior fasteners relative to the door hinge assembly such that

longitudinal fastening axes of the exterior fasteners are disposed on a second side of the vertical torsion bar when the door is in the open and closed positions in which the second side is opposite to the first side with respect to a vertical plane passing through the vertical torsion bar.